

## ABSTRACT

The present invention relates to simplified processes for the preparation of pure hydrogen peroxide ( $\text{H}_2\text{O}_2$ ).  $\text{H}_2\text{O}_2$  is a known oxidizer and disinfectant that is used in many industrial processes having many uses in the pharmaceutical, electronic, food and water purification industries. The present invention presents the use of sulfuric acid ( $\text{H}_2\text{SO}_4$ ) as a catalyst utilizing water and electricity as the only raw materials for the production of  $\text{H}_2\text{O}_2$ . Separation processes are performed with membranes. Produced hydrogen is used as a fuel in a fuel cell, thereby reducing electrical cost.

$\text{H}_2\text{O}_2$  is an ideal oxidizer and disinfectant in water purification systems, especially drinking water purification. All other disinfectants create disinfection by-products upon their reaction with Natural Organic Matter (NOM) in the water. Pure  $\text{H}_2\text{O}_2$  is a requirement for the electronics industry in the production of printed circuit boards. By producing  $\text{H}_2\text{O}_2$  without organic chemistry, organic contamination of  $\text{H}_2\text{O}_2$  is minimized.